CONTRIBUTIONS AND ORIGINAL ARTICLES.

THUNDERSTORMS OF MAY 3, 1892, IN NEW YORK STATE.

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This system of storms was of unusual severity and magnitude. At 8 a. m. an area of high pressure, 30.20, lay off the Florida coast, and a trough-like depression extended from Texas over the Upper Lakes, with lowest pressure, 29.70, over Iowa. At 8 p. m. the center of disturbance lay to the north of Lake Huron, with pressure 29.54. From the Atlantic coast over New York to the Great Lakes the pressure had decreased 0.20 inch. At 2 p. m. the temperature was about 10° above the normal in the western part of the state, and ranged from 74° near Lake Ontario to 78° on the southern border. The weather was also unusually warm in the northern part of the state, while on the coast it was several degrees below the normal. At 2 p. m. the winds were light and southerly, with a westerly component in the section west of the central lakes, and an easterly component at a great number of stations in the eastern section. At 8 and 9 p. m. the wind-directions were nearly the same as at 2 p. m., both in the front and rear of the storm.

During May 1st and 2d the sky had been overcast, and general rains occurred on both days. Thunderstorms were reported from Humphrey, Cattaragus Co., on the 1st and 2d, and from Long Island on the 2d. At 7 a. m., 3d, the sky was generally overcast, excepting in the central part of the southern section and in the western Saint Lawrence valley, where the cloudiness ranged from 5 to 6 (scale 10). At 2 p. m. the sky continued overcast in the western section and northern highlands; elsewhere the cloudiness had decreased, and at Ithaca the cloudiness was 5 cumulus moving west.

The storm was first reported from stations near the Niagara River between 1.30 and 2 p. m. It was last noted on the eastern border of the state about midnight, and on central Long Island about 2 a. m., 4th. The storm-front was not continuous, and presented many local variations of character and intensity; but the general line of advance extended over the state in a direction from southwest to northeast, the extremity near Lake Ontario being constantly in advance of the southern portion at the Pennsylvania border. There is evidence that the center of the storm, or convex front, moved over or near Lake Ontario at a rate of about 50 miles per hour in an east-northeast direction, and continued in that direction to Lake Champlain. This direction of the storm-center is not the usual one, and more data is needed to verify it. If this supposition is correct, a series of electrical disturbances which occurred in the northern part of the state between 5 and 8 p. m. fall into the general storm system; otherwise they must be regarded as isolated storms.

The most detailed account of the conditions attending the storm are furnished by self-recording instruments at the Ithaca station, as follows: The pressure had fallen from 29.148 at 8 a. m., 3d, to 28.980 at 5.30 p. m., when the storm reached the station and rain began. At 6.05 p. m. there was an increase of pressure of .07 inch in 15 minutes, during the heaviest rainfall. At 7 p. m. the pressure had decreased .03 inch. The temperature was 50° at 6 a. m., reached a maximum of 77° at 2 p. m., and remained nearly stationary until 6.05 p. m. At that time a fall of 15° occurred in 10 minutes. From 7 to 8 p. m. the temperature remained nearly stationary at 62°. No rain fell until 6.05 p. m. From 6.05 to 6.15 p. m. 0.52 of rain fell, and from 6.15 to 7.00 p. m. about 0.20 inch fell. During the afternoon the wind was from the south, the velocity being 8 to 12 miles per hour. At 6 p. m., immediately in advance of the storm, the wind changed to westerly, blowing out from the storm, and the velocity increased to 36 miles per hour. Soon after the storm-front reached the station the wind shifted to east, and it remained in that quarter one hour.

Thermograph records at other stations, Dunkirk and Arkwright, Chautauqua Co. (The Arkwright station is located near a hill top, 5 miles southeast of and 670 feet above Dunkirk.): A comparison shows the superheated condition of the surface air, and also that the temperature fell to the same point, 60°, during the storm. At Dunkirk the temperature at 6 a. m. was 50°, and the maximum, 78°.5, occurred at 12.30 p. m. At 1.45 p. m. a fall of 15° occurred in 10 minutes, and at 2.30 p. m. the temperature was 60°. At Arkwright the temperature at 6 a. m. was 55°.5, maximum 72° at 2.15 p. m. Between 3 and 3.50 p. m. the temperature fell from 72° to 60°. (The long interval between the phenomena at the two stations may be due to errors of thermograph clocks). At Hess Roads Station, on the shore of Lake Ontario, 65 miles north-northeast from Dunkirk, the temperature at 6 a. m. was 45°, maximum 74° at 1.85 p. m., temperature 70° at 2.15 p. m., 65° at 2.30 p. m., and 63° at 3.25 p. m. At other stations the greatest fall in temperature occurred on the western border of the state, where it amounted to 26°. As the storm moved eastward the fall became less; in the central lake region it amounted to about 17°, and on the eastern border of the state was 2° to 5°. This difference was probably due, in part, to the nocturnal cooling of the surface air.

There was a great local variation in the rainfall attending the storm. The amount in the central and western parts of the state averaged about 0.50 inch, the greater part probably falling within a few minutes after the commencement of the storm. The rainfall was somewhat greater in the eastern part of the state, where the shower was of longer duration. The only part of the state where no rain fell was the northern portion of the Saint Lawrence Valley, and in the northern Adirondacks. Hail the size of peas was reported at three scattered stations: Eden, Oswego, and Fleming. The wind force showed great local variations, and cannot well be summarized. The maximum velocities were all entered under the head "during the storm," with the wind blowing from the west, or out from the storm.

Chart V, with this number of the REVIEW, shows the line of advance of the thunderstorms of May 3, 1892, the storm-intensity in the different parts of the state, and the location of storms which occurred in advance of the main disturbance.

METEOROLOGICAL TABLES.

Meteorological record of Army post surgeons, voluntary, and other co-operating observers, May, 1892.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean.	Precip'n.
Alabama.	°	°	°	*Ins.*
Bermuda *†5	88	46	71.0	1.09
Bessemer	90	44	71.1	2.86
Brewton†	95	44	69.1	3.80
Carrollton *†1	89	50	70.7	3.20
Chepultepec†	79	45	.....	2.10
Citronelle†	86	50	74.2	1.97
Claiborne Landing†	.....	.....	.....	3.90
Cordova†	.....	.....	.....	2.72
Daphne†	96	51	75.1	1.15
Decatur *a*†	.....	.....	.....	2.71
Decatur *b*†	92	39	68.5	2.29
Double Springs †1	83	47	67.6	3.36
Eufaula *a*†	96	45	74.2	3.31
Eufaula *b*	94	43	71.5	.....
Evergreen†	90	46	72.4	2.83
Fayette C. H.†	87	45	69.6	3.68
Florence *a*†	.....	.....	.....	3.46
Florence *b*†	89	42	68.8	3.43
Fort Deposit†	98	45	73.2	1.62
Gadsden†	.....	.....	.....	2.22
Geneva†	100	51	75.6	1.08
Greensborough†	88	46	70.9	3.88
Healing Springs†	93	36	69.0	4.75
Highland Home†	90	48	72.4	2.86
Jasper†	86	40	66.4	3.29
Jemison	87	53	73.2	3.65
Livingston *a*† 1	86	44	69.3	4.92
Livingston *b*†	90	45	70.7	5.03
Lynn†	.....	.....	.....	3.90
Marion†	91	44	70.8	1.09
Maysville †	83	47	66.0	5.93
Mountain Home†	89	40	67.2	3.73
Mount Willing†	89	45	72.0	3.95
Alabama—Cont.				
Newburgh †	87	42	68.3	3.59
Newton *†1	90	50	71.5	0.80
Opelika †	94	42	70.0	2.72
Oxanna *†1	84	42	68.3	4.10
Pine Apple†	96	45	73.1	3.11
Pittsborough †	90	54	74.8	1.50
Pushmataha†	89	47	69.7	8.94
Selma *a*†	.....	.....	.....	3.23
Scottsboro†	88	41	67.8	4.57
Sturdevant †	.....	.....	.....	3.57
Talladega †	.....	.....	.....	3.00
Tallassee Falls †	.....	.....	.....	2.52
Thomasville †	93	46	72.0	6.17
Tuscaloosa †	.....	.....	.....	2.92
Tuscumbia *a* *1	89	50	69.3	3.35
Union Springs *a*†	93	42	72.2	1.70
Union Springs *b*†	94	44	74.0	3.42
Valley Head †1	85	44	66.0	4.39
Walker Springs †	94	50	77.3	5.39
Warrior †	.....	.....	.....	4.50
Wiggins †	98	45	74.4	1.56
Wilsonville †	.....	.....	.....	3.23
Alaska.				
Killisnoo †1	68	34	44.8	3.25
Metlakahtla †	68	34	50.4	5.90
Arizona.				
Ariz. Can. Co. Dam.†	105	47	74.6	0.41
Benson *1	105	50	73.0	0.00
Bisbee †1	92*	40	66.6	0.00
Calabasas †	94	34	66.0	0.04
Casa Grande *1	106	54	77.9	0.34
Chiricahua Mts †	.....	.....	.....	0.00
Crittenden *†5	97	37	67.3	0.36

Meteorological record of voluntary observers, &c.—Continued.

Stations.	Temperature. (Fahrenheit.) Max.	Min.	Mean	Precip'n.
Arizona—Cont'd.	°	°	°	*Ins.*
Dos Cabezos *†1	82	50	67.2	T.
Dragoon Summit *1	93	60	75.2	0.04
Dudleyville †	103	40	71.0	0.38
Farleys Camp	96	50	74.8	0.25
Flagstaff *†1	84	21	50.7	7.55
Florence†	105	43	73.0	0.45
Fort Apache	88	28	56.8	0.36
Fort Bowie	92	40	67.2	0.00
Fort Grant	93	34	66.0	0.35
Fort Huachuca	92	33	65.2	0.06
Fort Mohave†	115	45	77.7	0.38
Gila Bend *a* *†1	96	60	79.5	0.20
Gila Bend *b* *1	110?	58	83.0	0.23
Grand Central Mill	.....	.....	.....	0.11
Holbrook †	87	24	57.0	0.17
Lochiel *†1	92	47	67.7[d]	0.19
Maricopa *1	110	63	82.5	0.14
Mount Huachuca†	94	30	66.6	T.
Natural Bridge†	.....	.....	.....	0.50
Navajo Springs†	.....	.....	.....	0.00
New River†	99	43	70.2	0.29
Oracle †1	91	30	66.9	.....
Pantano *1	97	42	72.3	0.62
Payson *1	94	36	61.8	0.35
Peoria	104	45	75.0	0.18
Phœnix *a*†	106	39	75.3	0.15
Red Rock *5	106	50	83.8	0.49
Saint Johns †	.....	.....	.....	0.70
San Carlos	106	33	69.6	0.08
San Simon *1	106	63	78.1	0.00
Signal †	105	44	73.4	0.85
Teviston	.....	.....	.....	0.00
Texas Hill *1	111	42	76.2	0.00
Tucson *a*†	103	43	73.8	0.36
Arizona—Cont'd.				
Walnut Grove †	.....	.....	.....	0.06
Walnut Ranch *†1	90	34	63.3	0.00
Whipple Barracks	89	13	54.3	0.85
Willcox *1	92	62	77.2	1.02
Wilgus †	.....	.....	.....	T.
Winslow *†5	93	42	71.4	0.40
Wood Cañon	.....	.....	.....	T.
Woodruff †	.....	.....	.....	0.40
Yuma *1	103	61	76.6	0.00
Arkansas.				
Arkadelphia †	.....	.....	.....	12.95
Arkansas City †	.....	.....	.....	3.71
Black Rock *†1	90	40	68.1	9.30
Brinkley †	84	46	67.8	10.06
Camden *a*†	.....	.....	.....	5.83
Camden *b*† 1	89	44	68.8	5.77
Conway *1	83	51	67.0	10.01
Corner Stone *1	86[m]	56[1]	72.4[m]	6.68
Dallas †1	87	39	66.5	15.80
Dardanelle †	.....	.....	.....	9.33
El Dorado †	87	36	66.0	6.53
Fayetteville †1	85	37	63.1	12.07
Forrest City †	87	46	69.4	7.55
Fulton †	.....	.....	.....	5.57
Gaines Landing †	.....	.....	.....	3.92
Harrison†	88	39	64.8	7.52
Helena *a*†	.....	.....	.....	4.23
Helena *b*†	89	46	70.4	5.19
Hope †1	93	40	70.4	12.75
Hot Springs	90	38	65.7	12.45
Lead Hill *	95	44	.....	8.50
Lonoke *1	86	46	70.6	10.37
Madding [2]	.....	.....	68.2	7.91
Malvern†	84	41	70.4	7.47